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INTRODUCTION

Processing tomato breeding at The Ohio State University OARDC focuses on the development of cultivars for the midwest U. S. processing industry. The breeding program is divided into three phases: variety evaluation, the core breeding program, and germplasm development. This report summarizes both variety evaluation for the 1996 field season and the priority projects of the core breeding program.

Variety evaluation is a collaborative effort with Dr. W. Bash at the Food Industries center in Columbus. The most promising varieties from the OARDC breeding program and from commercial sources are mechanically harvested in Fremont and shipped to the Food Industries Center for processing. Varieties showing well for both absolute hue and hue uniformity include: Heinz H9423; Ohio 9442, OX52, OX72, OX70, OX137, O87175, OX4, and OX 23R. Varieties showing well with respect to depth of color and its uniformity include OX150, OX151, OX137, OX88, OX52, OX23R, and Ohio 9442. Of these, OX70 and OX4 lack firmness and OX137 and O87175 are marginal with respect to firmness. The varieties OX52 and OX72 will be available for large scale grower trials in 1997. Several varieties that showed promise in 1995 had "yellow shoulder" problems while others performed well in 1996. In addition to the 32 lines processed by the Food Industries center, we obtained objective measurements of fruit quality (firmness, color, color uniformity, soluble solids, pH, and titratable acidity) from 119 varieties or test lines in replicated plots using the fruit quality facilities in Wooster, OH. These plots represented replicated trials at three locations and included nearly eighty new hybrid combinations.

The core breeding program is emphasizing color, early maturity, and disease resistance. These priority areas reflect the needs of growers and processors emphasizing whole-peel tomatoes as indicated by industry response to survey questions in 1995 and 1996. Two aspects of color, absolute color and color uniformity, are of specific interest. In 1996 we continued to obtain objective measures of fruit color to allow comparisons within fruit, within plot, and within genotype and to compare color and uniformity over years. Some genotypes are more uniform with respect to color. An example of a breeding line exhibiting excellent color uniformity is Ohio 9442. Open pollinated breeding lines that combine firmness with the excellent absolute color and high lycopene qualities of crimson fruit (ogc) have also been identified. Projects on disease resistance emphasize bacterial canker, early blight, bacterial spot, bacterial speck, and anthracnose. Diseases that have not ranked highly in the survey, but may become a problem in future years are Late Blight, Verticillium root rot (Verticillium race 2), and powdery mildew.

MATERIALS AND METHODS:

Field Trials.
Data presented in this report were obtained from field trials located at The OARDC Vegetable Branch, Fremont, OH.; The OARDC Horticulture Farm, Wooster, OH.; and a growers field located in Wood County, OH.

At the Fremont location, beds were prepared in silty clay loam soil May 23, 1996. Fertilizer applications included broadcasts of 550 lb/Acre (0-10-46) October 23, 1995 and 206 lb/Acre (34-0-0 equiv. to 70 lb N/Acre). Herbicide applications included 0.5 lb/A Sencor Solupak and 1.25 pt/A Trifluralin 4EC incorporated with a power bedder (May 30, 1996), and spray applications of 0.5 lb/A Sencor DF (Jul. 8, 1996). Insect and disease control followed TOMCAST recommendations. At the Wooster location, plants were grown on flat ground. Fertilizer was disked in at 600 lb/Acre (10-20-20). Herbicide applications included 0.5 lb/A Sencor Solupak and 1.25 pt/A Trifluralin 4EC incorporated by disk with (May 23, 1996). Insect and disease control followed a calendar schedule. Weather data for the Fremont location are presented in Table 1.

Transplants from the greenhouse were grown in standard 288 plug trays. Seed was sown April 3, 1996. Transplant dates were May 25, 1996 for the Wood County location, June 1, 1996 for the Wooster location, and June 5, 1996 for the Fremont location. Trials were transplanted using 1/2 pint of starter fertilizer (10-34-0 diluted 1 qt. in 50 gal H_2O). At Wooster, each plot consisted of a single-row planting, 20 plants per row, spaced 12 inches, and rows 5 ft apart. Double bed plots were planted at the Fremont location with 20 plants per row, spaced 12 inches, and rows 5 ft apart. The "Canning Trial" at Fremont consisted of double bed plots with 80 plants per row. Thirty foot twin row plots with plant spacing at 18 inches were planted at the Wood County location.

Harvest: Harvest was timed to coincide with the time that marketable fruit were approaching optimum recovery. A Johnson tomato harvester was used for once over machine-harvest at the Fremont location. Yield data were collected for usable ripe-red fruit (lb/plot) and converted to ton/A based on a planting density of 12,000 plants/A. Percentages of usable fruit, green fruit, and culled fruit, are expressed on a weight basis. When possible, second row plots were harvested at Fremont one to two weeks after optimum harvest. Second harvest Culls provide a measure of "holding" ability. The Wooster and Wood County locations were harvested by hand.

Fruit Quality Evaluation: Fruit quality evaluation was performed in the small fruit quality lab, OARDC, Wooster. Replicated measurements were taken on fruit firmness, fruit color, soluble solids, pH, and titratable acidity. Firmness measurements were based on the force needed to rupture fruit using an Instron model 1011 equipped with a star press probe. Descent rate was set at 50 mm/min. and the instrument calibrated to 5 Kg force. Seven to ten fruit were measured per plot. Force to rupture (first peak) was measured in grams and this value provides an estimate of fruit firmness.

Color measurements were based on the metric standard color space (CIELAB or L*a*b*) using a Minolta CR 100 colorimeter with an 8 mm reading diameter and the standard daylight illuminant (C). Fruit were cut along the stem scar end to remove the peal and reveal the mesocarp tissue (though not the locule) and two measurements were taken from opposite sides of

each fruit. Stem scar end color evaluation was performed on eight to twelve fruit per plot, providing up to six replicates for some varieties. Color data were converted to descriptive measurements including L* , a measure of lightness; hue angle, a measure of color; and chroma, a measure of saturation or vividness. Lower L* values correspond to darker color and lower hue values correspond to more red (as opposed to orange). Higher chroma values correspond to more vivid color.

Measurements of soluble solids, pH, and titratable acidity were performed on a puree of a representative sample of fruit for each plot (8-10 fruit). Soluble solids were measured using an American Optic Abbe Refractometer. The raw sample (10 ml) was diluted 1/5 with distilled water for pH determination, followed by direct titration using 0.1 N NaOH to a final pH of 8.1. Titratable acidity was converted to percent citric acid by the correction factor 0.064. Results for pH and percent acid as citrate are not presented as all varieties and lines tested fell within acceptable ranges (between pH 3.8 and pH 4.2 and between 0.31 and 0.47 citric acid).

Data Analysis and Presentation:

Field trials are subject to environmental variation that can obscure differences between varieties. The use of replication can reduce (though not eliminate) the effects of variation due to environment. The Least Significant Difference (LSD 0.05) statistic provides a stringent means of comparing two varieties. When the difference between the trait mean of two varieties exceeds the LSD, the difference between the varieties is probably due to a genetic difference rather than environmental variation.

In this year's report we present both the average value and the standard deviation of measurements where appropriate. The standard deviation is presented as a measure of the variability for each trait. Variability in fruit color is an example of a trait where uniformity may be more important than the absolute value. In this report, color variation is presented as within plot variation (Tables 3, 4, 5, 6, 7) and between plot variation (Tables 10, 11). For Tables 8, 9, and 12, both between plot variation (sd plt) and within plot variation (sd w/) are presented. The standard deviation of hue angle (fruit color), L (depth of color), and Chroma (vividness) differed between genotypes and provided more discrimination between genotypes than absolute color based on hue angle.

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Table 1. Weather Data for OARDC Vegetable Crops Branch, Fremont, OH and the Horticulture Farm, Wooster, OH in 1996.

Fremont

	1996 Temperature °F			Long-Term Averages Temperature °F		
Month	Min.	Max.	Rainfall	Min.	Max.	Rainfall
April	33.9	56.3	4.08	37.9	59.0	3.39
May	46.7	66.5	4.14	48.3	70.5	3.59
June	61.0	80.7	4.29	58.1	80.1	3.99
July	58.6	81.6	4.82	61.8	84.0	3.90
August	57.1	83.1	0.03	59.5	82.0	3.36
September	50.5	73.4	4.35	52.2	75.4	3.07

Wooster

	1996 Temperature °F			Long-Term Averages Temperature °F		
Month	Min.	Max.	Rainfall	Min.	Max.	Rainfall
April	35.7	59.9	4.89	36.7	59.5	3.35
May	48.5	68.4	4.50	46.5	70.6	3.90
June	60.1	82.0	5.01	55.6	79.5	3.95
July	58.6	81.9	3.69	59.7	83.6	4.12
August	60.2	84.2	1.82	57.9	82.1	3.65
September	55.2	73.5	5.08	51.4	75.6	3.16

Table 2. Summary of Maturity and Relative Yield over 4 years.

Variety	Maturity	sd	Relative Yield [c]		sd
O 8245 [a]	106.0	7.07	- 1.91	CDE	3.21
PS 696 [a]	105.2	8.31	+ 2.56	ABCD	5.36
OX 42 [a]	104.6	9.57	+ 4.59	ABC	5.03
OX 137	103.5	6.61	- 4.65	E	5.08
OX 38 [a]	103.3	8.09	+ 3.85	ABC	0.6
OX 52 [b]	102.7	4.75	+ 7.71	A	5.83
OX 53	102.5	10.75	+ 5.28	AB	4.28
OX 120	99.9	9.81	- 1.57	CDE	4.55
OX 72 [b]	99.8	8.37	+ 0.9	BCDE	5.37
OX 64	99.6	8.15	+ 2.02	ABCD	0.81
O 7983 [a]	99.5	6.81	- 3.65	DE	3.55
OX 88 [a]	99.5	8.66	+ 2.73	ABCD	3.68
OX 139	97.5	8.50	- 3.5	DE	7.22

[a] Commercially available.

[b] Trial quantities available for 1997.

[c] Relative yield is calculated as the yield for a specific variety minus the average yield for the trial. Relative yield data were averaged over the 1993, 1994, 1995, and 1996 growing seasons. Means with the same letter are not significantly different.

Table 3. Yield potential and firmness estimates for Canning trial.

Variety or Test Line	Harvest Date	Yield T/A	% Red	% Green	% Cull	Late % Cull	Force to Rupture (gm)	sd
E1856	9/4/96	34.6	92	6	2	5	1052.7	170
O7983	9/4/96	22.5	83	13	4	7	1174	162.5
O87160	9/4/96	15.7	88	5	7	4	nd	nd
OX120	9/4/96	33.8	91	5	3	nd	1104.2	138.2
OX4	9/4/96	29.9	80	19	2	7	942.5	195.6
OX88	9/4/96	36.4	81	17	3	5	1055.2	178.2
O88119	9/6/96	9.8	71	17	11	13	1276.8	258
OX139	9/6/96	28	85	8	7	nd	1090.2	296.6
OX150	9/6/96	33.8	80	15	4	nd	1160.3	161.4
OX151	9/6/96	44.1	87	9	4	nd	1037.3	196
OX52	9/6/96	19.5	82	12	7	nd	1178.6	250.9
OX53	9/6/96	21.8	85	8	7	nd	1002.1	255.5
O87175	9/11/96	12	82	9	8	9	940.5	229.7
O9442	9/11/96	27.7	89	7	5	nd	1176.5	167.9
OX137	9/11/96	27.8	87	8	5	nd	1008.2	216.7
OX23	9/11/96	27.8	84	10	5	nd	1295.7	211.5
OX38	9/11/96	27.8	91	6	3	6	1189.9	220.5
OX64	9/11/96	44.4	87	9	4	nd	1190.3	164.8
SO12	9/11/96	33	87	10	4	nd	1186.4	197.8
E3111	9/12/96	34.5	88	9	3	7	1152.3	217.7
E3259	9/12/96	32	90	6	3	6	1157.6	277.6
OX42	9/12/96	32.5	88	7	4	5	1204.3	201.9
OX49	9/12/96	22.1	84	7	9	16	1084.5	229.5
OX70	9/12/96	28.9	80	9	11	19	1136.3	253.1
OX72	9/12/96	37.6	88	8	4	9	1352.2	252.2
PS696	9/12/96	32.3	83	12	4	5	1268.8	160
H9144	9/19/96	51	88	8	3	8	1234.6	295.7
H9422	9/19/96	42.8	90	7	3	4	1414.6	199.7
H9423	9/19/96	42.5	92	6	2	11	1477.6	185.6
O8245	9/19/96	40.1	85	12	3	nd	1461.9	208.5
O8446	9/19/96	25.7	83	7	10	nd	1222.2	210.1
PS31212	9/19/96	49.2	93	3	4	14	1368.4	153
LSD 0.05							196.4	
C.V.							18.3	
mean		31.3					1175.3	

Table 4. Color evaluation of raw fruit from Canning trial.

Variety or Test Line	Harvest Date	Color evaluation L	sd	Hue	sd	Chr	sd
E1856	9/4/96	44.6	2.6	56.4	6.1	30.5	3.6
O7983	9/4/96	40.8	2.7	54.9	5.6	26.9	3.8
O87160	9/4/96	45.4	4.5	56.6	5.4	31.5	3
OX120	9/4/96	43.1	5.4	59.1	15.9	30.1	2.6
OX4	9/4/96	41.4	6.2	57.6	7	27.2	3.9
OX88	9/4/96	42.8	4.7	55.7	7.8	29.4	3.6
O88119	9/6/96	43.8	3.7	55.3	8.5	29.4	2.8
OX139	9/6/96	40.1	2.1	48	5.7	29.1	3.1
OX150	9/6/96	41.8	3.6	49.6	6.2	28.6	2.4
OX151	9/6/96	41.6	4.6	52.8	6.8	27	2.9
OX52	9/6/96	43.4	3.2	55	13.2	29.1	3.2
OX53	9/6/96	43	2.9	52.9	7.9	27.2	2.9
O87175	9/11/96	36.4	3.3	46.9	8.2	25.9	3.5
O9442	9/11/96	38.4	2.4	51.3	5.3	26.1	4
OX137	9/11/96	42.8	5.9	52.7	11	29.3	2.2
OX23	9/11/96	40.9	3.1	50.2	8.1	29	2.6
OX38	9/11/96	44.5	3.5	51.6	5.3	32.8	1.9
OX64	9/11/96	46.6	7.3	59.4	18.4	31.7	3.2
SO12	9/11/96	39.4	2.6	48.8	4.8	27.5	3.2
E3111	9/12/96	45.7	5.7	57.4	16.7	31.8	1.8
E3259	9/12/96	42.5	3.3	53.9	13.5	30.5	3
OX42	9/12/96	43	6	50.8	10.6	31.4	3.7
OX49	9/12/96	38.7	3.2	50.5	6.4	25.2	1.8
OX70	9/12/96	39.8	6.8	53	18.2	26.6	3
OX72	9/12/96	41.8	1.9	48	4	31.1	2.8
PS696	9/12/96	39.9	2.6	49.2	6.9	27.8	2.1
H9144	9/19/96	46.8	5	59.1	12.4	32.7	2.5
H9422	9/19/96	43.8	4.6	49.1	6.6	33.3	5.4
H9423	9/19/96	45.4	1.5	47.8	1.6	36.4	2.2
O8245	9/19/96	44.3	4.8	55.1	19.1	32.6	3.8
O8446	9/19/96	42	3.4	47.3	3.6	34.4	3.1
PS31212	9/19/96	45.5	4.5	53.6	8.5	33	2.6
LSD 0.05		3.7		8.8		2.7	
C.V.		10.0		19.0		10.4	
mean		42.5		52.8		29.8	

Table 5. Color evaluation of processed fruit from Canning trial.

Variety or Test Line	Harvest Date	Color evaluation L	sd	Hue	sd	Chr	sd
E1856	9/4/96	35.8	2.3	58.9	8.7	23.6	2.9
O7983	9/4/96	35.4	1.7	55.6	9.9	22.3	1.9
O87160	9/4/96	37.3	3.5	59.1	6.8	25.2	5
OX120	9/4/96	35.1	2	57.4	6.1	22.2	1.3
OX4	9/4/96	35.4	0.7	53.4	4.7	23.1	2.1
OX88	9/4/96	34.5	1.2	55	7.5	21.7	1.6
O88119	9/6/96	36	2.4	57.7	8.5	22.5	1.8
OX139	9/6/96	35.6	1.5	59.3	8.5	21.8	2.2
OX150	9/6/96	35.1	1.9	59.1	7.6	21.4	2.1
OX151	9/6/96	34.8	1	53.8	5.2	21.9	2.2
OX52	9/6/96	35.3	1.3	55.5	6.6	22.9	1.8
OX53	9/6/96	34.8	3	60.9	9	21.7	3.1
O87175	9/11/96	34.4	1.9	52.5	5.9	22.5	2.2
O9442	9/11/96	35.1	1	56.3	6.4	22.7	1.7
OX137	9/11/96	34.9	1.5	50.8	5	23.1	1.3
OX23	9/11/96	34.3	1.7	53	3.8	22.1	1.8
OX38	9/11/96	37.8	1.6	60.1	7.1	25.9	2.2
OX64	9/11/96	37.3	2.5	60.7	8.6	24.9	2.5
SO12	9/11/96	36.4	2.5	59.5	9.1	23.2	2.1
E3111	9/12/96	38	3.6	57.6	10	27.3	3
E3259	9/12/96	36.6	3.2	55.8	11.4	24.8	2.4
OX42	9/12/96	37.7	2.4	56.6	9.1	27.6	3.1
OX49	9/12/96	36.7	2.1	59.8	7	23.7	2
OX70	9/12/96	35.2	1.4	56.2	4.9	23.5	1.7
OX72	9/12/96	37.4	2.4	53.5	6.7	25.4	2.1
PS696	9/12/96	35.6	1.9	58	7.3	22.3	2
H9144	9/19/96	39.3	3.7	61.6	10.7	26.4	3.2
H9422	9/19/96	37.1	2.5	55.1	6.6	26.1	2.8
H9423	9/19/96	36.4	1.2	50.6	2	26.4	3.1
O8245	9/19/96	36.9	2.2	58.2	8.6	24.9	3
O8446	9/19/96	38.7	2.5	58.6	8.1	25.7	2.5
PS31212	9/19/96	36	3.2	58.6	6.6	24.3	3.3
LSD 0.05		1.9		6.4		2.1	
C.V.		6.2		23.3		13.5	
mean		36.2		56.9		23.9	

Table 6. Raw fruit color and firmness evaluation from Wood County, OH trial. Data are summarized for first harvest dates only and ranked by average days to harvest in 1996.

Variety or Test Line	Color evaluation L	sd	Hue	sd	Chroma	sd	Force to rupture (gm)	sd
OX4	45.2	2	47.3	3.6	34.9	1.8	1491	373
OX139	46.1	4.6	52.8	8.9	33.8	2.5	1457	256
OX23	49.8	3.3	52.2	7.5	33.8	5.3	1528	303
O7983	46.2	2	50.2	3.7	33.6	1.3	1258	174
OX9	46.9	4.1	50.1	6.1	35	2	1905	244
OX70	36.5	1.1	42.6	2.1	26.9	2.2	1062	164
SO12	45.6	2.8	49.6	2.6	31.8	1.5	1394	507
OX88	45.2	2.8	50.2	5.2	32.8	2.9	1253	199
OX52	45.7	3.5	52.1	6	33.6	2.3	1373	243
OX53	38.9	2.8	45.2	3	29	2.9	1422	241
OX137	43.8	1.5	47.4	2.7	33.5	2.1	1363	176
O8245	41	1.9	44.7	2.1	32.4	3.5	1619	300
OX72	38.6	1.8	45.6	3	28	3.1	1517	448
PS696	43.6	2.6	50.6	3.4	31	2.8	1459	194
OX38	41.6	3.1	48.4	2.2	32.5	3.4	1419	234
OX42	39.1	2.1	44.4	2.3	31.7	3.9	1533	213
LSD 0.05	2.5		4.0		3.0		200.4	
C.V.	6.3		8.9		9.9		19.5	
mean	42.7		47.8		32.0		1460	

Table 7. Raw fruit color and firmness evaluation from OARDC Horticulture Farm, Wooster, OH. Data are summarized for first harvest dates only and ranked by average days to harvest in 1996.

Variety or Test Line	Color evaluation L	sd	Hue	sd	Chroma	sd	Force to rupture (gm)	sd
OX4	43.2	2.2	51.3	4	31	1.9	1176	232
OX139	46.8	2.6	58.9	6.9	30.9	1.1	1195	211
OX23	43.2	2.6	50	3.4	30.9	2.2	1186	238
O7983	42.7	3	50.1	5.3	30.4	2.6	1217	210
OX9	45.6	4	56	7.3	31.9	2.6	1228	246
OX70	44.6	3.9	59.7	11.8	31.6	1.6	1138	150
SO12	47	1.9	56.3	5.4	30.9	1.8	1395	222
OX88	46.3	3.2	56.5	6.8	31.7	1.7	1201	194
O88119	43.3	2.7	51.3	6.1	29.2	1.2	1302	198
OX52	42.8	1.9	52.5	3.7	29.5	1.8	1309	162
OX53	43	2.1	54.8	4.9	29.3	1.6	1216	174
OX137	44.5	2.8	50.8	4.8	30.4	1.3	1101	278
O8245	44.1	3.6	54.1	6.7	30.7	2.6	1183	194
OX72	41.7	2.4	50.6	3.1	29	1.5	1110	179
PS696	46.2	1.9	62.3	5.3	30.8	1.3	1288	197
OX38	44.1	2	55.5	4.3	31.5	1.8	1356	196
OX42	46.2	3.7	58.9	8.1	30.3	2.1	1252	154
LSD 0.05	2.6		5.3		1.6		106.0	
C.V.	8.4		13.8		7.5		18.0	
mean	44.2		54.3		30.6		1223	

Table 8. Raw fruit color and firmness evaluation from OARDC Vegetable Crops Branch, Fremont, OH. Data are summarized for first harvest dates only and ranked by average days to harvest in 1996.

Variety	L	sd (plt)	sd (w/)	Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force (gm)	sd (plt)	sd (w/)
OX4	42.6	1.1	2.5	50.2	1.4	4.1	30.2	2	2.1	1298	187	224
OX139	43.2	3	3.9	54.6	7.3	9.5	30	1	2.9	1373	156	256
OX23	43.4	0.8	2.9	53.1	3.6	6.5	31	1.7	2.9	1263	225	255
O7983	44	3.9	5.2	57.6	4.8	9.3	30.2	1.8	3.1	1411	258	214
OX9	45.3	1.2	4.4	53.1	1.8	9.8	33.3	1.8	2.4	1297	130	191
OX70	42.2	3.7	3.9	57.2	5.6	10.2	28.9	3.5	2.7	1114	144	216
SO12	42.5	2.5	4.1	53.6	3.6	7.8	31.2	2.8	2.8	1429	237	229
OX88	42.9	3.7	3.9	51	4.3	5.7	30.4	1.4	2.3	1179	159	177
O88119	45.8	1.9	4.1	54.7	4.1	7.5	34.2	2.4	2.5	1326	255	275
OX52	42.7	1.6	4.6	52	2.5	8.5	31.5	1.4	3.1	1285	127	217
OX53	43.3	3	4.4	53.7	6.9	8.6	31	1.6	2.7	1149	181	182
OX137	40.5	2.5	2.9	46.4	1.7	4.2	30.2	2	3.1	1239	154	203
O8245	48.4	2.7	4.3	59.9	7.3	10.4	33.5	1.9	2.9	1336	143	304
OX72	47.8	2.6	4.6	57.7	8.2	10.3	34.7	1.9	2.7	1489	235	298
PS696	44.3	2.9	3.8	53.7	5.7	7.7	31.6	1.4	2.8	1315	171	206
OX38	47.4	2	5.3	56.9	4.4	10.3	34.1	1.6	2.9	1417	173	225
OX42	46.5	1.6	4.8	54.1	3.6	9.3	34.1	2	2.5	1438	210	232
LSD 0.05	2.0			4.1			1.3			124.3		
C.V.	11.0			18.4			10.1			20.7		
mean	44.4			54.2			31.8			1339		

Table 9. Raw fruit color and firmness evaluation averaged for three locations. Data are summarized for first harvest dates only, and ranked by average days to harvest in 1996.

Variety	Harvest (Days)	L	sd (plt)	sd (w/)	Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force (gm)	sd (plt)	sd (w/)
OX4	95.8	43.1	1.5	2.3	50.3	2.2	4	31	2.1	2	1278	171	243
OX139	96.2	44.3	2.9	3.8	55	6	9	30.8	1.7	2.5	1357	149	248
OX23	97.6	44.2	3.7	2.8	51.6	3.1	5.3	31.3	1.9	2.9	1268	191	255
O7983	98.5	43.8	3.2	4.2	54.6	5.3	7.6	30.6	1.9	2.8	1329	215	208
OX9	99	45.6	1.5	4.2	53.7	3.9	8.5	33	1.8	2.4	1342	235	215
OX70	100	41.6	4	3.5	55.2	7.6	9.1	29	3.1	2.4	1109	115	196
SO12	100.3	43.8	2.8	3.5	53.4	3.5	6.5	31.3	2.2	2.4	1418	185	274
OX88	100.9	44.2	3.3	3.6	52.6	4.2	6	31	1.5	2.2	1193	131	184
O88119	101.8	45.3	2	3.8	54	3.9	7.2	33.2	3	2.2	1318	200	249
OX52	101.9	43	1.7	3.7	52.1	2.7	6.8	31.1	1.7	2.6	1301	126	203
OX53	102.1	42.7	3.2	3.7	53	6.6	7.2	30.4	1.7	2.5	1194	169	187
OX137	103.2	41.7	2.7	2.7	47.3	2.2	4	30.8	2	2.6	1237	145	211
O8245	103.8	45.4	3.9	3.5	54.6	8.3	7.4	32.4	2.1	3	1342	221	264
OX72	103.8	45.3	4.6	3.8	54.5	8.2	7.9	32.6	3.5	2.6	1431	241	303
PS696	104	44.6	2.3	3.2	54.8	6	6.3	31.3	1.1	2.5	1338	139	201
OX38	104.9	45.9	3.3	4.1	55.6	7	7.7	33.2	1.9	2.6	1399	133	217
OX42	105.1	45.7	3	4.2	54.6	5.5	8.3	32.7	2.5	2.5	1392	190	207
LSD 0.05		1.5			3.1			1.1			80.1		
C.V.		17.6			10.3			21.0			21.0		
mean		44.1			53.4			31.5			1311		

Table 10. Mechanical harvest evaluation of processing tomato varieties and test lines when ripe fruit was approaching optimum recovery. Results are averaged over replicated plots from the OARDC Vegetable Crops Branch, Fremont, OH. Varieties and test lines are ranked according to maturity in 1996. The categories "Early", "Early-Mid", "Mid-Late", and "Late" are subjective relative to checks.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Early									
OX1	92	39.2	9.1	88	9	3	nd	nd.	nd.
OX208	95	37.7	8	90	7	3	nd	2.5	0
OX210	95	32.6	1.1	89	7	3	21	2.4	0.4
OX102	95.3	27.8	3	85	10	6	9	2.2	0.1
OX107	95.3	30.6	8.1	88	7	5	15	2.2	0.2
OX46	95.3	28.1	11.7	91	4	5	16	2.3	0.3
O8383	95.7	34.1	12.7	89	5	6	51	3.1	0
OX101	95.7	34.1	1.5	84	13	3	10	2.1	0
OX146	95.7	35.3	10.7	85	9	6	21	1.9	0
OX193	96	34.4	3	91	5	4	21	2.7	0
OX211	96	33.1	7.3	84	10	5	18	1.9	0
RCAT9201	97.3	25.8	7.2	82	14	4	19	1.9	0.1
OX139	97.5	21.2	16	81	15	3	6	2	0.3
OX175	97.7	33.8	0.8	90	6	4	nd	2.1	0.1
OX198	97.7	35.9	4.1	88	7	5	10	2.3	0.1
OX106	98	39.6	5.9	83	15	2	17	1.9	0
OX147	98	34.5	3.4	92	6	2	11	2	0
OX171	98	32.1	2.1	82	6	12	nd	2.2	0.1
OX221	98	40.7	2.7	90	7	3	14	2.4	0.1
OX222	98	34.2	5.3	86	12	3	3	2.1	0.2
OX24	98	32	0.7	84	13	4	26	2.1	0.1
OX27	98	34.1	11.7	87	10	3	15	2.4	0.1
OX4	98.4	35.1	5.7	85	6	9	9	2.4	0.2
O87160	98.7	23.6	6.8	86	6	9	36	2.2	0.3
OX100	99.7	28.3	2.7	88	8	4	19	2.1	0.4
OX26	99.7	34.1	5.9	84	13	2	2	2.3	0.1
OX44	99.7	33.7	7.5	90	5	5	20	3	0.5
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 10. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Early-Mid									
OX203	100	35.3	5.7	89	7	4	5	2.1	0
OX209	100	38.1	4.7	82	6	11	nd	1.9	0.3
OX21	100	39.9	0.4	88	7	4	29	2.3	0.1
OX142	100.3	36.7	2.7	89	7	4	4	2	0.2
OX173	100.3	39.7	5	86	5	9	nd	2.4	0.1
OX196	100.3	35.4	2.1	87	9	4	14	2.4	0.1
OX2	100.3	36.5	1.8	88	9	4	13	2.2	0.1
OX202	100.3	38.7	0.8	85	11	5	14	2	0.2
OX204	100.3	42.8	6.2	81	14	5	14	2	0.1
E3228	100.5	20.2	1	80	10	10	16	2.1	0.1
O8239	100.7	34.1	2.8	83	10	7	72	2.6	0.3
OX170	100.7	40.1	0.2	88	9	3	nd	2.2	0.2
OX176	100.7	42.8	4.9	86	11	3	7	2.1	0.2
OX199	100.7	36.7	3.1	86	9	5	9	2.4	0.1
OX226	100.7	44.9	6.3	88	8	4	5	2.2	0.4
OX225	101	45.7	6.3	89	8	3	10	2.2	0.2
O8446	101.3	22.7	5.1	83	13	4	15	2.3	0.2
OX70	101.3	20.9	0.7	71	15	14	16	2.5	0.3
O8243	101.7	35.6	8	86	12	2	8	2.2	0.2
OX29	102	36.5	9.1	85	11	4	4	2.2	0.2
OX34	102	44.6	12.7	91	7	2	10	2.4	0
OX32	102.3	32.9	3.4	80	9	11	nd	1.9	0.1
OX36	102.3	43.2	8.3	84	13	3	6	2.3	0.2
O7983	102.5	27.3	10.6	78	14	8	8	2.2	0.4
OX219	102.7	36.8	9.2	87	8	5	nd	2.4	0.2
OX228	102.7	45.1	7.1	83	14	3	15	2.3	0.2
OX120	102.8	27.9	2.1	80	8	12	10	2.2	0.2
E1856	103	32	11.9	86	7	7	37	2.2	0.4
O88119	103	26.7	20.6	77	10	14	27	2.1	0.2
OX197	103	35.3	0.5	79	11	10	nd	2.5	0.1
OX229	103.3	33.5	6.3	82	9	9	nd	2.1	0.1
OX25	103.3	41.9	4.8	81	11	8	nd	2.3	0
OX3	103.4	39.5	4.7	85	12	4	16	2.1	0.2
O86120	103.5	30.5	7.4	84	10	6	19	2.3	0.2
O8675	104.2	32	5.2	85	9	5	16	2.1	0.2
OX178	104.3	37.4	0.6	86	8	6	nd	2.4	0.2
OX200	104.3	42.1	10.7	86	7	8	nd	2.1	0.2
OX220	104.3	35.2	8.6	81	13	6	nd	2.3	0.1
OX64	104.5	36.1	8.6	84	12	5	18	2	0.2
OX9	104.6	39.1	11.3	87	7	6	15	2.6	0.2
OX223	104.7	46.9	5	85	6	9	nd	2.2	0.1
OX52	104.8	34.9	9.1	86	10	4	5	1.9	0.2
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 10. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Mid-Late									
O8556	105	35.1	7	84	12	5	19	2.4	0.1
OX15	105	35	1.8	89	7	4	nd	2.4	0.1
OX17	105	37.1	0.6	82	8	10	nd	2.1	0.3
OX177	105	35.3	1.9	86	8	5	nd	2.2	0.2
OX227	105	36.8	10	88	6	5	nd	2.1	0.3
OX53	105	36.8	5.4	80	13	6	11	2.1	0.2
OX88	105	41.7	11.2	87	8	5	29	2.1	0.1
O7814	105.3	30	10.2	77	9	14	nd	2.1	0.1
OX218	105.3	36.6	7.4	81	11	8	nd	2.4	0.1
OX72	105.5	30.1	0.3	84	12	5	20	2	0.2
OX191	105.7	40.7	2.7	84	9	8	nd	2.4	0.3
OX232	105.7	42.6	0.4	79	10	10	nd	2.1	0.2
O9435	105.8	25.7	5.3	83	11	6	9	2.2	0.2
O9439	105.8	31.1	0.6	75	21	5	7	2.2	0.2
OX169	106	36.7	2	65	14	21	nd	2.2	0.2
O9441	106.3	27.4	13	75	20	5	14	2.2	0
OX14	106.3	39.5	8.8	86	5	9	nd	2	0.2
OX230	106.3	40.5	5.9	81	9	10	nd	2.1	0.1
O87175	106.6	30.8	8.6	85	10	5	14	2.1	0.1
OX206	106.7	41.4	4.2	81	17	2	2	2.5	0.2
OX23	106.7	43.8	4.7	76	15	9	nd	2	0.2
OX231	106.7	41.9	5.3	86	9	5	nd	2.2	0
OX97	106.7	44	9.1	85	9	6	nd	2.5	0.1
O9442	106.8	32.4	13.8	77	13	10	19	2	0.1
OX195	107	39.9	6.6	84	8	8	nd	2.6	0.3
OX201	107	42.8	0.8	85	7	8	nd	2.4	0.2
OX205	107	44	11.1	89	9	2	nd	2.3	0.3
OX7	107	37.7	1.5	79	8	14	nd	2.4	0.1
OX85	107	37.3	4.6	86	6	8	nd	2.2	0.2
OX224	107.7	47.8	11.1	81	12	7	nd	2	0.1
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 10. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Late									
O8245	108	28.9	7.7	79	16	5	9	2.3	0.2
OX192	108	47.3	5.4	82	8	10	nd	2.6	0
OX42	108.2	37.8	5.9	80	14	6	11	2	0.2
O8550	108.3	32.9	11.5	71	17	13	44	2.6	0.2
OX148	108.3	32.5	6.3	83	10	7	24	2.2	0.2
OX38	108.3	38.6	9.7	86	9	5	11	2.1	0.2
SO12	108.3	39.5	23.4	85	9	6	9	2.1	0.1
OX137	108.5	25.8	5.9	89	7	5	18	2.2	0.3
PS696	109	31.7	14.2	85	9	5	13	2.2	0.1
E3259	109.5	40.7	16.7	77	13	10	13	2.2	0.3
O9436	109.5	33.5	12.6	81	12	6	24	2.3	0.3
E3097	110	38.9	14.2	84	9	7	8	2.2	0.1
E3111	110.3	39.5	17.1	85	7	8	11	2.3	0.2
E3096	111	36.7	6.5	67	16	18	19	2.5	0.6
PS33011	111.3	36.4	9.4	72	18	10	21	2.3	0.2
O9244	111.8	30.7	12	80	11	9	29	2.4	0.1
O9241	112.5	34.6	10.9	78	15	7	24	2.3	0.2
E3211	113	24.8	10.3	66	15	19	36	2.1	0.3
O8444	113	23.7	16.8	65	15	21	34	2.5	0.2
O8689	113	29.9	12.8	82	9	9	20	2.2	0.2
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 11. Mechanical harvest evaluation of processing tomato varieties and test lines when ripe fruit was approaching optimum recovery. Results are averaged over replicated plots from the OARDC Vegetable Crops Branch, Fremont, OH. Varieties and test lines are ranked according to yield in 1996

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Early									
OX221	98	40.7	2.7	90	7	3	14	2.4	0.1
OX106	98	39.6	5.9	83	15	2	17	1.9	0
OX1	92	39.2	9.1	88	9	3	nd	nd.	nd.
OX208	95	37.7	8	90	7	3	nd	2.5	0
OX198	97.7	35.9	4.1	88	7	5	10	2.3	0.1
OX146	95.7	35.3	10.7	85	9	6	21	1.9	0
OX4	98.4	35.1	5.7	85	6	9	9	2.4	0.2
OX147	98	34.5	3.4	92	6	2	11	2	0
OX193	96	34.4	3	91	5	4	21	2.7	0
OX222	98	34.2	5.3	86	12	3	3	2.1	0.2
O8383	95.7	34.1	12.7	89	5	6	51	3.1	0
OX101	95.7	34.1	1.5	84	13	3	10	2.1	0
OX27	98	34.1	11.7	87	10	3	15	2.4	0.1
OX26	99.7	34.1	5.9	84	13	2	2	2.3	0.1
OX175	97.7	33.8	0.8	90	6	4	nd	2.1	0.1
OX44	99.7	33.7	7.5	90	5	5	20	3	0.5
OX211	96	33.1	7.3	84	10	5	18	1.9	0
OX210	95	32.6	1.1	89	7	3	21	2.4	0.4
OX171	98	32.1	2.1	82	6	12	nd	2.2	0.1
OX24	98	32	0.7	84	13	4	26	2.1	0.1
OX107	95.3	30.6	8.1	88	7	5	15	2.2	0.2
OX100	99.7	28.3	2.7	88	8	4	19	2.1	0.4
OX46	95.3	28.1	11.7	91	4	5	16	2.3	0.3
OX102	95.3	27.8	3	85	10	6	9	2.2	0.1
RCAT9201	97.3	25.8	7.2	82	14	4	19	1.9	0.1
O87160	98.7	23.6	6.8	86	6	9	36	2.2	0.3
OX139	97.5	21.2	16	81	15	3	6	2	0.3
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 11. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Early-Mid									
OX223	104.7	46.9	5	85	6	9	nd	2.2	0.1
OX225	101	45.7	6.3	89	8	3	10	2.2	0.2
OX228	102.7	45.1	7.1	83	14	3	15	2.3	0.2
OX226	100.7	44.9	6.3	88	8	4	5	2.2	0.4
OX34	102	44.6	12.7	91	7	2	10	2.4	0
OX36	102.3	43.2	8.3	84	13	3	6	2.3	0.2
OX204	100.3	42.8	6.2	81	14	5	14	2	0.1
OX176	100.7	42.8	4.9	86	11	3	7	2.1	0.2
OX200	104.3	42.1	10.7	86	7	8	nd	2.1	0.2
OX25	103.3	41.9	4.8	81	11	8	nd	2.3	0
OX170	100.7	40.1	0.2	88	9	3	nd	2.2	0.2
OX21	100	39.9	0.4	88	7	4	29	2.3	0.1
OX173	100.3	39.7	5	86	5	9	nd	2.4	0.1
OX3	103.4	39.5	4.7	85	12	4	16	2.1	0.2
OX9	104.6	39.1	11.3	87	7	6	15	2.6	0.2
OX202	100.3	38.7	0.8	85	11	5	14	2	0.2
OX209	100	38.1	4.7	82	6	11	nd	1.9	0.3
OX178	104.3	37.4	0.6	86	8	6	nd	2.4	0.2
OX219	102.7	36.8	9.2	87	8	5	nd	2.4	0.2
OX142	100.3	36.7	2.7	89	7	4	4	2	0.2
OX199	100.7	36.7	3.1	86	9	5	9	2.4	0.1
OX2	100.3	36.5	1.8	88	9	4	13	2.2	0.1
OX29	102	36.5	9.1	85	11	4	4	2.2	0.2
OX64	104.5	36.1	8.6	84	12	5	18	2	0.2
O8243	101.7	35.6	8	86	12	2	8	2.2	0.2
OX196	100.3	35.4	2.1	87	9	4	14	2.4	0.1
OX203	100	35.3	5.7	89	7	4	5	2.1	0
OX197	103	35.3	0.5	79	11	10	nd	2.5	0.1
OX220	104.3	35.2	8.6	81	13	6	nd	2.3	0.1
OX52	104.8	34.9	9.1	86	10	4	5	1.9	0.2
O8239	100.7	34.1	2.8	83	10	7	72	2.6	0.3
OX229	103.3	33.5	6.3	82	9	9	nd	2.1	0.1
OX32	102.3	32.9	3.4	80	9	11	nd	1.9	0.1
E1856	103	32	11.9	86	7	7	37	2.2	0.4
O8675	104.2	32	5.2	85	9	5	16	2.1	0.2
O86120	103.5	30.5	7.4	84	10	6	19	2.3	0.2
OX120	102.8	27.9	2.1	80	8	12	10	2.2	0.2
O7983	102.5	27.3	10.6	78	14	8	8	2.2	0.4
O88119	103	26.7	20.6	77	10	14	27	2.1	0.2
O8446	101.3	22.7	5.1	83	13	4	15	2.3	0.2
OX70	101.3	20.9	0.7	71	15	14	16	2.5	0.3
E3228	100.5	20.2	1	80	10	10	16	2.1	0.1
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 11. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Mid-Late									
OX224	107.7	47.8	11.1	81	12	7	nd	2	0.1
OX97	106.7	44	9.1	85	9	6	nd	2.5	0.1
OX205	107	44	11.1	89	9	2	nd	2.3	0.3
OX23	106.7	43.8	4.7	76	15	9	nd	2	0.2
OX201	107	42.8	0.8	85	7	8	nd	2.4	0.2
OX232	105.7	42.6	0.4	79	10	10	nd	2.1	0.2
OX231	106.7	41.9	5.3	86	9	5	nd	2.2	0
OX88	105	41.7	11.2	87	8	5	29	2.1	0.1
OX206	106.7	41.4	4.2	81	17	2	2	2.5	0.2
OX191	105.7	40.7	2.7	84	9	8	nd	2.4	0.3
OX230	106.3	40.5	5.9	81	9	10	nd	2.1	0.1
OX195	107	39.9	6.6	84	8	8	nd	2.6	0.3
OX14	106.3	39.5	8.8	86	5	9	nd	2	0.2
OX7	107	37.7	1.5	79	8	14	nd	2.4	0.1
OX85	107	37.3	4.6	86	6	8	nd	2.2	0.2
OX17	105	37.1	0.6	82	8	10	nd	2.1	0.3
OX227	105	36.8	10	88	6	5	nd	2.1	0.3
OX53	105	36.8	5.4	80	13	6	11	2.1	0.2
OX169	106	36.7	2	65	14	21	nd	2.2	0.2
OX218	105.3	36.6	7.4	81	11	8	nd	2.4	0.1
OX177	105	35.3	1.9	86	8	5	nd	2.2	0.2
O8556	105	35.1	7	84	12	5	19	2.4	0.1
OX15	105	35	1.8	89	7	4	nd	2.4	0.1
O9442	106.8	32.4	13.8	77	13	10	19	2	0.1
O9439	105.8	31.1	0.6	75	21	5	7	2.2	0.2
O87175	106.6	30.8	8.6	85	10	5	14	2.1	0.1
OX72	105.5	30.1	0.3	84	12	5	20	2	0.2
O7814	105.3	30	10.2	77	9	14	nd	2.1	0.1
O9441	106.3	27.4	13	75	20	5	14	2.2	0
O9435	105.8	25.7	5.3	83	11	6	9	2.2	0.2
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 11. Continued.

Variety or Test Line	Days to Harvest	T/Acre	sd	% Red	% Green	% Cull	Late % Cull	Fruit Size (Oz.)	sd
Late									
OX192	108	47.3	5.4	82	8	10	nd	2.6	0
E3259	109.5	40.7	16.7	77	13	10	13	2.2	0.3
SO12	108.3	39.5	23.4	85	9	6	9	2.1	0.1
E3111	110.3	39.5	17.1	85	7	8	11	2.3	0.2
E3097	110	38.9	14.2	84	9	7	8	2.2	0.1
OX38	108.3	38.6	9.7	86	9	5	11	2.1	0.2
OX42	108.2	37.8	5.9	80	14	6	11	2	0.2
E3096	111	36.7	6.5	67	16	18	19	2.5	0.6
PS33011	111.3	36.4	9.4	72	18	10	21	2.3	0.2
O9241	112.5	34.6	10.9	78	15	7	24	2.3	0.2
O9436	109.5	33.5	12.6	81	12	6	24	2.3	0.3
O8550	108.3	32.9	11.5	71	17	13	44	2.6	0.2
OX148	108.3	32.5	6.3	83	10	7	24	2.2	0.2
PS696	109	31.7	14.2	85	9	5	13	2.2	0.1
O9244	111.8	30.7	12	80	11	9	29	2.4	0.1
O8689	113	29.9	12.8	82	9	9	20	2.2	0.2
O8245	108	28.9	7.7	79	16	5	9	2.3	0.2
OX137	108.5	25.8	5.9	89	7	5	18	2.2	0.3
E3211	113	24.8	10.3	66	15	19	36	2.1	0.3
O8444	113	23.7	16.8	65	15	21	34	2.5	0.2
LSD 0.05		15.6						0.36	
C.V.		23.3						9.9	

Table 12. Laboratory evaluation of raw fruit quality for processing tomato varieties and test lines ranked according to average days to maturity in 1996 (See Table 10.)

Variety or Test Line	Color evaluation L	sd (plt)	sd (w/)	Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force to rupture (gm)	sd (plt)	sd (w/)	Brix
Early													
OX1	41.4	1.6	2	50.4	0.4	5.8	30.8	1.2	3.7	1208	76	209	4.1
OX208	41.7	1.6	3.7	52.4	7.7	10.7	29.8	1.5	2.7	1190	269	168	4.2
OX210	43.5	3.1	3.4	54	7.3	6.2	32	3.3	3.2	1001	nd	257	3.7
OX102	43	1	3.5	54.1	3.4	8.1	31.2	1	3.2	1290	87	115	3.9
OX107	40.7	3.7	3.8	49.8	4.7	4.6	30.5	1.5	3.8	1275	52	138	3.7
OX46	42.7	2.2	2.8	50.6	2.2	3.7	31.6	1.6	2.9	1397	52	322	3.9
O8383	43	1	3.9	49.5	1.2	6	34	2.5	3.5	1238	38	217	3.9
OX101	43.1	1.5	3.9	57.4	3	12	30.4	1.7	3	1460	83	170	3.8
OX146	42	2.6	4.1	52.6	3.9	6.7	29.7	1.3	2.6	1224	84	95	3.9
OX193	41.5	1	3.3	49.5	2.5	5.8	31	1.7	3.2	1175	69	173	3.9
OX211	39.9	2.9	2.8	46.9	3.3	3.7	29.9	2.6	3.9	1208	7	192	4.1
RCAT9201	41.4	4.4	3.6	51.5	8.7	7.8	29.1	1.8	3.5	1149	335	249	4.3
OX139	43.2	3	3.9	54.6	7.3	9.5	30	1	2.9	1373	156	256	3.8
OX175	42.9	0.7	3.6	55.3	3.8	7.5	30.5	1.6	3.2	1470	240	274	3.9
OX198	45.4	3.7	3.9	57	8.7	9.6	33.2	1.3	2	1369	189	220	3.6
OX106	43.8	1.8	2.7	52.7	4.5	5.5	30.7	0.3	2.2	1410	246	176	3.7
OX147	44.7	2	5.9	56.6	5.5	10.7	30	0.8	3	1263	208	191	4.0
OX171	42.7	3.7	3.9	51.5	7.6	8.4	31.4	0.9	2.7	1177	80	153	4.2
OX221	43.1	2	5.3	55.1	4.2	13	31.3	1.1	3.1	1212	111	199	3.6
OX222	42.6	2.2	4.5	55.5	4.4	10.8	30.2	1	2.6	1358	285	206	3.8
OX24	43.8	1.4	4	55.2	0.9	13.1	30.2	1	3.1	1356	128	195	3.9
OX27	45.3	1.7	4.4	58.9	2.1	9.8	29.9	1.3	2.6	1276	237	267	4.2
OX4	42.6	1.1	2.5	50.2	1.4	4.1	30.2	2	2.1	1298	187	224	3.9
O87160	43.7	2.8	4	52.6	6	7	32.7	1.3	2	1311	120	208	3.6
OX100	40.7	2.2	3.6	51.2	3.4	7.2	28.8	1.6	2.4	1240	208	164	4.2
OX26	45.6	2.2	3.7	58.4	4.6	9.1	31.1	1.4	2.8	1414	319	214	4.3
OX44	40.9	1.4	3.7	47.5	0.7	4.9	30.8	1.2	2.9	1276	346	256	4.3
LSD 0.05	3.8			2.9			7.9			275.1			0.64
C.V.	5.7			6.2			9.8			14.1			8.6

Table 12 (continued)

Variety or Test Line	Color evaluation L	sd (plt)	sd (w/)	Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force to rupture (gm)	sd (plt)	sd (w/)	Brix
Early-Mid													
OX203	41	0.7	3.9	48	1	5.7	30.6	1	3.3	1180	191	264	4.0
OX209	42.4	2	3.7	51.8	3.2	8	30.9	2.3	3.7	1257	62	208	3.8
OX21	43.2	2.6	3.9	54.7	6.9	11.3	30.6	1.9	2.9	1148	325	235	3.9
OX142	45.6	2.6	5.9	58.2	3.5	17.5	31.6	1.6	3.1	1200	132	251	3.4
OX173	44.1	3.2	5.2	54.8	3.3	10.2	30.3	1.9	3	1257	179	191	4.0
OX196	41.2	1.9	2.7	50.8	2.4	6.6	29.7	2.4	3	1237	83	296	3.9
OX2	42	1.9	3.5	50	3.4	5.6	31.8	1.3	3.4	1204	120	197	4.2
OX202	42.1	1.4	3.5	49.8	3	7.8	31.7	1.8	2.5	1238	91	284	3.8
OX204	41	1	2.8	47.4	2.8	4.5	30.4	2.7	2.8	1266	225	315	4.2
E3228	42.8	1.9	3.2	53.1	6.6	6.7	30.7	1.1	3.2	1192	125	158	3.8
O8239	45.5	1.4	5.2	56.6	1.6	9.9	29.9	0.9	2.3	1307	221	264	4.2
OX170	44.7	1.6	5.1	54	4.5	12	32.5	4.4	2.8	1167	156	170	3.9
OX176	44	0.7	5.5	54.7	2.6	11.7	30.8	1.2	2.8	1271	208	167	3.6
OX199	43.6	4.1	3.6	53.5	7.1	7.1	30.8	1.2	2.9	1070	158	156	4.0
OX226	43.2	2.4	4.7	51.4	5.5	9	30.9	1.1	2.7	1130	199	187	3.5
OX225	42.5	2.9	5.5	51	6.1	11.3	31.6	2.5	4.1	1126	99	203	4.0
O8446	43.6	2.3	3.8	53.7	6.8	8.4	33.5	1.3	4.1	1400	285	381	4.0
OX70	42.2	3.7	3.9	57.2	5.6	10.2	28.9	3.5	2.7	1114	144	216	4.2
O8243	43.4	4.3	3.5	53.4	7.3	7.5	31	1.8	2.8	1251	110	236	4.1
OX29	45.7	0.7	3.9	57.1	5.6	11.7	32.8	2.3	3.4	1200	150	156	3.8
OX34	45.8	5.5	4.2	57.2	10.6	8.5	31.9	2.1	3.6	1142	229	240	3.6
OX32	42	2.8	4.1	53.3	7	6.1	29.3	2	3.5	1301	155	207	3.8
OX36	47.1	1.3	4.9	59.4	5.8	8.9	31.7	2	3.7	1241	163	201	4.0
O7983	44	3.9	5.2	57.6	4.8	9.3	30.2	1.8	3.1	1411	258	214	4.2
OX219	40.2	0.6	3.1	47.7	1.5	6.6	29.2	1	3.8	1091	73	210	4.3
OX228	43.2	1	5.1	49.6	1.2	9.1	30.9	2.2	3.2	1132	146	213	4.0
OX120	42.7	2.7	3.5	53.3	7.7	7.4	29.2	2.1	2.4	1235	155	215	4.1
E1856	43.2	2.5	3.7	49.2	5.9	7.2	34.3	2.5	2.5	1096	51	229	3.1
O88119	45.8	1.9	4.1	54.7	4.1	7.5	34.2	2.4	2.5	1326	255	275	3.3
OX197	41.6	1.6	4.7	53	5.3	7.9	29.3	2	3.3	1279	151	160	3.8
OX229	41.7	3.3	3.6	50.3	3	8	31.8	2.6	1.6	1340	154	239	3.5
OX25	43	1	3.9	51.4	1.2	8.7	32.5	1.4	2.2	1508	246	166	4.2
OX3	45.1	1.1	5.8	56.1	4.6	12.7	32.2	1.1	3	1267	75	231	3.5
O86120	43.9	3.5	4.9	56.5	8.8	12	29.2	2.8	3.1	1125	179	215	4.1
O8675	44	3.6	4	53.8	5.4	7.5	30.6	2.2	3.5	1237	84	197	4.0
OX178	42.9	1.9	4.7	55.8	8.9	11.5	30.3	1	4.1	1259	151	213	4.2
OX200	43.3	4.9	3.8	53.5	8.4	7.3	30.2	0.4	2.2	1324	252	217	3.5
OX220	43.4	3	4.6	56.8	9.2	10.3	29.1	0.7	4.4	1130	126	173	3.6
OX64	44.4	2	4.2	54.8	4.6	9.4	32.3	0.4	2.7	1251	198	200	3.4
OX9	45.3	1.2	4.4	53.1	1.8	9.8	33.3	1.8	2.4	1297	130	191	4.0
OX223	41.7	3.7	4.3	50.8	4.1	8.9	30.3	2.1	4	1150	185	171	4.0
OX52	42.7	1.6	4.6	52	2.5	8.5	31.5	1.4	3.1	1285	127	217	4.1
LSD 0.05	3.8			2.9			7.9			275.1			0.64
C.V.	5.7			6.2			9.8			14.1			8.6

Table 12 (continued)

Variety or Test Line	Color evaluation L	sd (plt)	sd (w/)	Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force to rupture (gm)	sd (plt)	sd (w/)	Brix
Late-Mid													
O8556	41.3	0.8	3.9	48.9	1.8	6.9	29.5	1.9	2.4	1060	99	221	4.1
OX15	43.5	0.3	3.2	52.5	3.6	6.6	31.3	1.4	2.8	1241	88	287	4.0
OX17	43.4	0.2	4.3	53.3	1.8	7.7	30	0.6	2.7	1031	74	211	3.9
OX177	42.8	2.5	3.7	54.1	8.1	8.6	31.3	2.2	2.3	1214	119	166	4.2
OX227	40.4	2.1	2.7	46.4	2.3	4.3	30.4	1.3	2.6	1024	101	135	3.8
OX53	43.3	3	4.4	53.7	6.9	8.6	31	1.6	2.7	1149	181	182	3.7
OX88	42.9	3.7	3.9	51	4.3	5.7	30.4	1.4	2.3	1179	159	177	3.5
O7814	43	1.2	5	53.2	1.7	7.5	31.4	1.4	3.2	1245	79	268	4.1
OX218	43.1	3.8	4.5	53.1	7.1	10.6	29.6	1.3	2.5	1023	119	161	3.9
OX72	47.8	2.6	4.6	57.7	8.2	10.3	34.7	1.9	2.7	1489	235	298	2.9
OX191	41.9	1.2	3.3	51.1	2.6	7.7	30.8	1.3	2.2	1274	248	231	3.9
OX232	46	2.2	6.3	55.6	6.5	12.6	31.7	2.3	3	1139	252	196	4.0
O9439	45.9	2.3	5.9	55.6	7.8	12.5	31	3.1	2.2	1204	98	239	4.5
O9435	44	1.4	5.5	56.3	6.4	14.2	29.7	1.2	2.7	1160	69	211	4.2
OX169	41.3	2.4	3.7	50.2	5.4	9	31.3	2.5	3.5	1204	205	214	3.9
O9441	41.6	1.7	2.9	47.9	2.6	3.4	31.1	3.2	3	1222	143	211	4.3
OX14	43.7	3.1	4.6	54	4.8	7.7	30.8	1.5	3.1	1405	101	272	4.4
OX230	43.2	1	5.6	54.1	4.6	10.6	30.7	0.7	2.8	1133	185	192	3.9
O87175	43.5	2.4	4.6	51	5.4	8.6	30.5	1.6	2.7	1087	138	179	4.5
OX206	42.9	0.3	4.1	52.5	4.2	8.5	32.7	0.3	3.3	1130	26	231	4.3
OX23	43.4	0.8	2.9	53.1	3.6	6.5	31	1.7	2.9	1263	225	255	3.9
OX231	40.5	1.9	3.9	48.2	1.4	7	28.9	1.9	3.3	1120	184	193	4.2
OX97	48.7	4.3	5.6	63.1	8.9	14.1	32.8	0.3	2.7	1119	184	155	3.5
O9442	41.8	2.1	3.7	52	0.7	8.1	28.6	3.7	3.1	1297	157	265	4.4
OX195	43	3.4	4.5	51.6	5.5	6.8	30.3	0.5	2.3	1110	137	186	4.0
OX201	42.7	1.2	4.6	51.2	3.7	8.3	30.4	2.4	3.5	1155	243	190	3.9
OX205	42.3	2	3.7	50.3	2.6	6.9	32.2	1.5	2.8	1180	182	142	4.1
OX7	44.4	2.4	3.9	57.5	9.1	9.5	30.7	2.1	2.7	1218	120	181	3.7
OX85	41.6	1.9	3.9	50.2	3.1	4.9	30	2.2	3.2	1077	59	149	3.9
OX224	47	3.9	5.6	59.2	10.5	11.8	32.9	2.5	3.5	1353	249	244	3.7
LSD 0.05	3.8			2.9			7.9			275.1			0.64
C.V.	5.7			6.2			9.8			14.1			8.6

Table 12 (continued)

Variety or Test Line	L	sd (plt)	sd (w/)	Color evaluation Hue	sd (plt)	sd (w/)	Chr	sd (plt)	sd (w/)	Force to rupture (gm)	sd (plt)	sd (w/)	Brix
Late													
O8245	48.4	2.7	4.3	59.9	7.3	10.4	33.5	1.9	2.9	1336	143	304	4.0
OX192	48.6	1.5	6.2	62.3	8.2	14.5	33.5	2.2	2.9	1239	232	247	4.1
OX42	46.5	1.6	4.8	54.1	3.6	9.3	34.1	2	2.5	1438	210	232	3.7
O8550	44.1	1.4	3.9	50.9	2.8	7.3	30.1	2	2.7	1181	200	223	4.3
OX148	45.4	2.7	3.6	54.4	5.3	6.9	32.6	3.1	2.2	1332	143	202	3.6
SO12	42.5	2.5	4.1	53.6	3.6	7.8	31.2	2.8	2.8	1429	237	229	3.9
OX38	47.4	2	5.3	56.9	4.4	10.3	34.1	1.6	2.9	1417	173	225	3.8
OX137	40.5	2.5	2.9	46.4	1.7	4.2	30.2	2	3.1	1239	154	203	4.1
PS696	44.3	2.9	3.8	53.7	5.7	7.7	31.6	1.4	2.8	1315	171	206	3.6
E3259	43.7	2.5	3.7	48.5	1.6	6.1	32.8	2.1	2.7	1605	214	253	4.0
O9436	42.3	2.6	3.7	46.9	2.6	4.6	31.2	1.7	3.4	1164	139	178	4.1
E3097	45.4	2.3	4.7	53.3	4.1	9.6	35	2.6	3.1	1256	162	255	3.7
E3111	43.5	2.2	3.5	49.8	5.2	5.4	32.5	2.2	2.8	1336	227	231	4.2
E3096	51.4	3.9	6	63.4	6.6	12	33.9	1.5	3	1578	144	279	3.7
PS33011	47.5	1.2	4.1	55.9	3.8	7.5	35.5	1.1	2	1552	203	289	3.5
O9244	42.8	1.9	4.2	48.7	2.9	6.2	32.3	1.6	2.7	1364	274	243	3.8
O9241	42.7	2.4	3.4	47.5	2.6	4	32.2	2.8	2.8	1353	190	203	4.1
E3211	42.1	1.2	3.9	46.7	2.7	4.1	30.6	1.5	2.9	1238	228	192	4.1
O8444	44.3	3.1	3.4	53.2	9.4	6.1	32.9	1.7	2.5	1428	224	367	4.9
O8689	44.8	1.9	5.3	51.3	0.3	7.9	32.1	3.1	2.8	1252	189	214	4.3
LSD 0.05	3.8			2.9			7.9			275.1			0.64
C.V.	5.7			6.2			9.8			14.1			8.6

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